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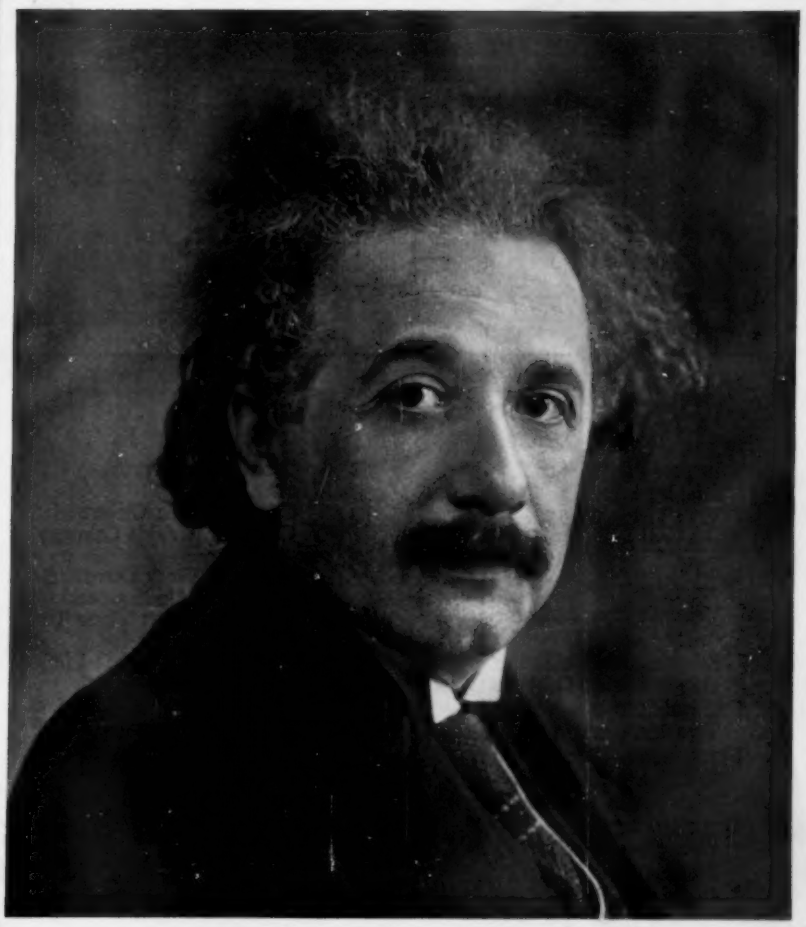
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JANUARY 24, 1931

Revolutionist of Scientific Thought

See Page 51

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Vol. XIX *No. 511*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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• DO YOU KNOW THAT •

City buildings are rarely damaged by lightning because a heavy steel frame acts as a perfect ground for the lightning discharge.

An elevator believed to be the longest single-lift elevator in existence is to be built to carry visitors up from Carlsbad Caverns to the surface.

The average size of farms in the United States has remained practically the same for the past thirty years.

Piano manufacturers, recognizing a difference in public taste, produce pianos in several tones, such as treble, medium, and bass.

A meteorite which fell near Adelaide, Australia, in December scattered fragments weighing from two to ten pounds all around the rim of the crater into which it fell.

Breakfast in some respects is the most important meal of the day and should contain from one-fourth to one-third of the day's food ration, a university nutritionist advises.

Of the 16,000 mothers in this country who die each year in maternity, no less than 10,000 might be saved by early and continuous medical and nursing care, Dr. Louis I. Dublin, well known statistician, declares.

Talking moving pictures are being made by the U. S. Army for use in training soldiers.

The crater of Haleakala, a huge extinct volcano in the Hawaiian Islands, is large enough to hold Manhattan Island.

A church just constructed at Dortmund, in Germany, has a concrete framework and walls of glass of different colors.

A weather station on wheels is proving valuable in fighting forest fires in the west.

Images of native deities and saints from China, India and Africa are a feature of the exhibits in the Missionary Museum at Princeton, where the exhibits are used as study material.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY
- Inspect Maya Ruins 62
- Missing Link City 54
- Visit Mayas For Study 58

ASTRONOMY
- Eros 59

BIOPHYSICS
- Yeast Detects Radiations 63

BOTANY
- Ethnobotanical Museum 57
- Fungus Resists Cold and Heat 53

ENGINEERING
- Two Elevators in One Shaft 63

ETHNOLOGY
- Ethnobotanical Museum 57
- Visit Mayas For Study 58

GENERAL SCIENCE
- First Glances at New Books 64
- Einstein Collaborators 52
- In Science Fields 56-57

GEOLOGY
- New Theory of Earth's Origin 62

MEDICINE
- Facts About Cancer 57

NUTRITION
- Check Vitamin Claims 58
- Corn Sugar Adds Calories 56

PHYSICS
- Einstein's Work Discussed 51
- Laboratory Underground 57
- Relativity Passes Three Tests 52

PSYCHOLOGY
- Remembering What's Pleasant 58

PUBLIC HEALTH
- Flu Epidemic in 1932 53
- Infant Welfare 62
- More Jake Paralysis 56
- National Advisory Health Council 57
- Tularemia in Canada 57

SEISMOLOGY
- Mexican Earthquake 56

SOCIOLOGY
- Family Influence 56

ZOOLOGY
- Rodents 63
- Snails With Big Feet 56

Science Service presents over the radio, an address

THE EARTH AS AN ENGINEERING STRUCTURE

By Dr. William Bowie, in charge of the Division of Geodesy of the U. S. Coast and Geodetic Survey, Washington, D. C., and an authority on isostasy.

Friday, January 30, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSICS

Einstein Discusses Revolution He Caused In Scientific Thought

Feasted by Pasadena Colleagues, He Hears Drs. Millikan, Michelson and Campbell Explain His Achievements

Prof. and Mrs. Albert Einstein were welcomed to comradeship in the scientific circles of Pasadena by a banquet given Jan. 15 by two hundred members of the California Institute Associates, held in the new and beautiful Athenaeum (see SCIENCE NEWS LETTER, Jan. 3, 1931). A nationwide radio audience of the Columbia Broadcasting System heard the speeches, excerpts from which are given here.

By DR. ALBERT EINSTEIN

Translated by Prof. William B. Munro

FROM far away I have come to you; but not to strangers. I have come among men who for many years have been true comrades with me in my labors. You, my honored Dr. Michelson, began with this work when I was only a little youngster, hardly three feet high. It was you who led the physicists into new paths, and through your marvellous experimental work paved the way for the development of the theory of relativity. You uncovered an insidious defect in the ether theory of light, as it then existed, and stimulated the ideas of H. A. Lorentz and Fitz Gerald, out of which the special theory of relativity developed. These in turn pointed the way to the general theory of relativity, and to the theory of gravitation. Without your work this theory would today be scarcely more than an interesting speculation; it was your verifications which first set the theory on a real basis.

Campbell's determination of the bending of rays of light coming past the sun; St. John's determination of the red shift of spectral lines due to the gravitational potential existing at the surface of the sun; Adams' determination of the red shift in the light which comes to us from the companion of Sirius—these provide the best support for the general theory of relativity.

Going beyond all this, the work of your wonderful observatory, through the recent discoveries of Hubble concerning the dependence of the red shift in the spectral lines of the spiral nebulæ on their distance, has led to a dynamic conception of the spatial structure of the universe, to which Tolman's work has given an original and especially illuminating theoretical expression.

Likewise in the realm of the quantum theory I am grateful to you for important assistance because of your fundamental experimental investigations. Here I acknowledge gratefully Millikan's researches concerning the photo-electric effect which first proved conclusively that the emission of electrons from solid bodies under the influence of light is associated with definite period vibration of the light itself, which result of the quantum theory is especially characteristic for the corpuscular structure of radiation.

While I let my spirit reflect upon all this, I account myself exceedingly fortunate to be able to break bread with you here in joyous mood, full of the happy conviction that your researches will continue through the future to broaden and deepen without let or hindrance, our knowledge of Nature's mysterious forces. From my heart I thank you all.

By DR. R. A. MILLIKAN

THE distinguishing feature of modern scientific thought lies in the fact that it begins by discarding all *a priori* conceptions about the nature of reality—or about the ultimate nature of the universe—such as had characterized practically all of Greek philosophy and all of medieval thinking as well, and takes instead, as its starting point, well authenticated, carefully tested experimental facts, no matter whether these facts seem at the moment to fit into any general philosophical scheme or not—that is, no matter whether they seem at the moment to be reasonable or not. In a word, modern science is essentially empirical, and no one has done more to make it so than the theoretical physicist, Albert Einstein. That, in a sentence, is, I take it, his greatest contribution to modern thought.

I wish to dispel a very common misconception, for the average man, who only knows science from afar, labors, I suspect, under the misunderstanding that we honor Einstein only because he was the author of the theory of relativity.

Now, every physicist knows that the Nobel prize committee, which awarded him that honor in 1921, did not have to consider the theory of relativity at all in making that award. They might have given it on any one of at least four grounds, and the scientific world would have been unanimous in applauding the award on any one of them. I myself have the best of reasons for knowing which one of these four they actually chose, the late Professor Gullstrand, the chairman of the Nobel committee in making the 1923 award, stated that it was the experimental verification of the Einstein photo-electric equation that removed all doubt as to its validity in the minds of the committee, so that they chose the first theoretical statement of that equation in 1905 by Professor Einstein as the basis of the award to him in 1921 and the experimental verification thereof as the half basis of the 1923 award. Now, this equation has nothing whatever to do with relativity, but I think that all students of modern physics will agree that it is of quite as far reaching significance as is relativity, or, indeed, as is anything that has appeared in modern physics, for it necessitated, as soon as it was firmly established, our return to at least a semi-corpuscular theory of the nature of radiant energy.

SUN'S SPECTRUM GIVES ONE PROOF OF THE THEORY OF RELATIVITY

"If the positions of the thousands of dark lines . . . . be measured very accurately, it should be found, Einstein said, that the lines are displaced by an exceedingly small but definite amount toward the red end of the spectrum."

The extraordinary penetration and boldness which Einstein showed in 1905 in accepting a new group of experimental facts and following them to what seemed to him to be their inevitable consequences, whether they were reasonable or not as gauged by the conceptions prevalent at the time, has never been more strikingly demonstrated.

Any small contributions that I myself may have made to the progress of physics have been largely in the nature of experimental verification of predictions contained in three theoretical equations first set up by Einstein and but one of these has had anything to do with relativity.

The first of these was the Brownian movement equation (1905) whose verification by a number of observers removed the last doubts as to the atomic theory of matter; the second was the aforementioned photo-electric equation (1905) which changed radically our conception as to the nature of radiation; the third was the equation expressing the interconvertibility of mass and energy. This grew out of special relativity (also 1905) and it has recently predicted for me verifiable relations in the radio-active field, and it also constitutes the most important basis for the cosmic ray conclusions that I am now wishing to draw. All these three are of equal significance, I think, with the predictions from general theory of relativity, the experimental verification of which Dr. Campbell has just described.

You can throw (*Turn to page* 61)

PHYSICS

Relativity Passes Three Tests Declared Crucial by Einstein

Motion of Mercury, Bending of Light and Red Shift of Spectrum Described by One of Theory's Judges

By DR. W. W. CAMPBELL

WHEN Professor Einstein published his immortal theory of relativity, a theory evolved within the four walls of his study room, he in effect advised his colleagues in the physical sciences not to accept it until it had been subjected to certain observational tests of an astronomical nature. He described three such tests by which his theory must stand or fall.

Test No. 1.—The theory of relativity, he said, must explain and remove the discrepancy between the predicted and the observed motions of the planet Mercury. This little brother of the earth, revolving around the sun at an average distance about one-third as great as the earth's distance from the sun, refused to follow the path assigned to it by Sir Isaac Newton's law of gravitation. For more than half a century before Einstein, astronomers had sought diligently but in vain for the explanation. Promptly following the publication of Einstein's work, astronomer De Sitter of Holland applied the test to Mercury, and the theory of relativity accounted in full for the discrepancies referred to.

Test No. 2.—The theory of relativity, he said, required that a ray of light, say from a distant star, when passing close to the surface of our sun, should be bent slightly from its straight-line course by the gravitation pull of the sun upon it as an addition as an effect of the curvature of the space in which the sun is immersed. That a ray or pulse of light should be subject to gravitational attractions and that space should be curved were results or hypotheses new to the world. Einstein urged that astronomers endeavor to observe the phenomenon at times of total solar eclipse, the only times when the test can be applied by photographing the eclipsed sun's surroundings in order to record on the photographic plates the images of the stars in the neighborhood of the sun,—though of course these stars would be millions of times as far away as the sun. The star images should be slightly displaced from their normal positions, he said, and those nearest the sun displaced the most. In 1919, there occurred a total eclipse extremely favorable as to the astronomical elements, and the British Eclipse Committee, represented by Eddington and Davidson, sought to observe the Einstein phenomenon. Unfortunately, the programs of observations were sorely afflicted with clouds, and the images of only a few stars, seven as a maximum, were recorded, faintly and otherwise, on only a part of the plates exposed. Nevertheless, the measurements of the plates showed that the rays were bent from their straight-line courses in passing the sun and through angles approximately of the minute dimensions predicted by Einstein.

The William H. Crocker expedition from the Lick Observatory, University of California, represented by astronomers Campbell and Trumpler, observed the total solar eclipse of 1922 on the northwest coast of Australia, using four photo- (*Turn to page* 60)

EINSTEIN COLLABORATORS

In order of seniority, the scientists working with Einstein at Pasadena are:

Albert A. Michelson, Emeritus Director of the Ryerson Physical Laboratory of the Univerity of Chicago, now a permanent resident of Pasadena and an Associate of both the California Institute and the Mount Wilson Observatory;

Charles E. St. John, astrophysicist of the Mount Wilson Observatory.

William Wallace Campbell, President Emeritus of the University of California and formerly Director of the Lick Observatory.

Robert A. Millikan, Director of the Norman Bridge Laboratory of Physics of the California Institute.

Walter A. Adams, Director of the Mount Wilson Observatory.

Richard C. Tolman, Professor of Physical Chemistry and Theoretical Physics of the California Institute.

Edwin P. Hubble, astrophysicist of the Mount Wilson Observatory.

PUBLIC HEALTH

Possible 1932 Flu Epidemic Indicated by Ten-Year Survey

Three Minor Outbreaks in Decade Also Shown in Statistics on Industrial Workers

A SLIGHT increase in influenza this year over last year, with no big outbreak until 1932, is the probable forecast for this disease, based on a survey of the past ten years made by the Metropolitan Life Insurance Co.

The statisticians of the company point out that because ten years is not a very long time in the history of the disease, and because the great pandemic of 1918 does not exactly fit into the picture of a three-cycle, no definite prediction can be made.

"From such a short period it would be hazardous to draw any sweeping conclusions," they stated. However, their records show that every three years since 1920 has seen a big increase in the number of cases of influenza. The big years, 1920, 1923, 1926, 1929, were followed by two years of comparatively few cases.

The seasonal peaks in all the years correspond closely in the company's records. In the second year after an outbreak, the seasonal peak is a little higher than in the first. Such a seasonal increase during the next few months would indicate that the disease is following its usual cycle. So far, no increase in cases of influenza has been reported to the U. S. Public Health Service at Washington.

While the 1918 pandemic does not fit into the three-year cycle, it had many unusual features, which indicate that it may stand alone as an exception to the rule. For instance, it did not follow the usual seasonal course, but broke out suddenly in September and continued high for about eight months. The three-year outbreaks, on the contrary, start in about the first of the year and reach their peak in February or March.

"If the general character of the triplets of annual waves observed in the past ten years should continue to show itself in the future, then the year 1930 with its low death rate from influenza would be typical in its position immediately following the high crest of 1929," the company's report stated. "It would be followed in 1931 by a wave of somewhat higher but still moderate crest; and the year 1932 would then follow with another maximum death rate, not to be equalled again for two years thereafter."

Officials of the U. S. Public Health Service do not think the occurrence of influenza epidemics can be described by the term cycle, and they likewise state that no prediction as to the time of the next epidemic can be safely made.

Their records show epidemics in the years 1920, 1922, 1923, 1926, 1928, and 1929. These records are compiled from reports of state health officers and include the general population of the country. The insurance company's records, based on illness among their policy holders, are limited to the industrial population. This probably explains the difference in naming epidemic years.

Epidemic In England Now

England is now experiencing an epidemic which America has escaped so far. An increase in the disease has occurred in this country within the last few weeks, but this is no cause for alarm, the U. S. Public Health Service has stated. An increase in cases of influenza is to be expected at this season.

State health officers reported 2,687 cases for the week ending January 14. For the previous week there were 1,572. However, these figures are no higher than the figures for this time last year, health officials pointed out.

Whenever the spectre of influenza rears its head, even in far-off countries, health officials feel a natural concern. The speed with which influenza outbreaks travel, and the utter lack of knowledge of how to control them, are among the reasons for such uneasiness.

Science News Letter, January 24, 1931

BOTANY

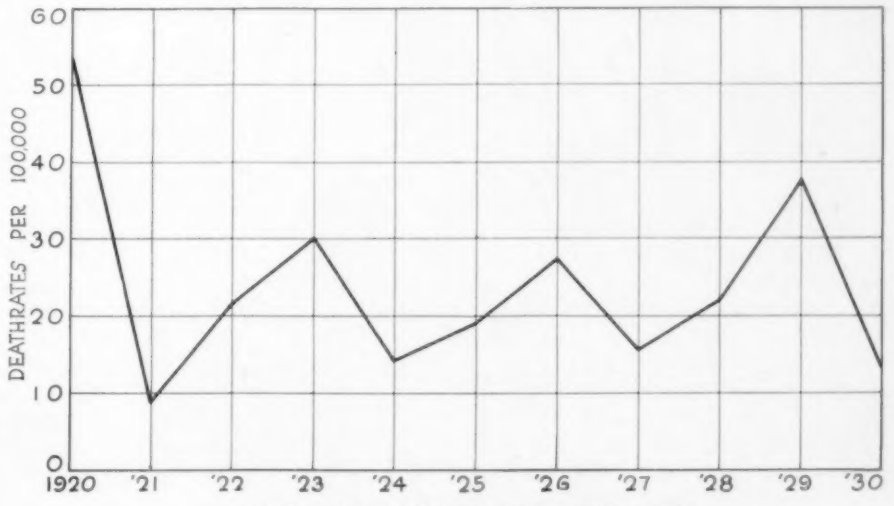
Tropical Fungus Spores Resist Cold As Well As Heat

A TROPICAL fungus whose reproductive bodies, or spores, are resistant to degrees of cold never encountered even by Arctic plants has been studied by Anna F. Faull of Harvard University. The material she used in her tests was found on a burnt stump in Cuba after a severe brush fire, and belongs to a species frequently found on burnt-over lands.

To test its resistance to heat, Miss Faull subjected its spores to temperatures slightly higher than 50 degrees Centigrade, which is halfway to the boiling point. This had little effect, except that it delayed their sprouting a little.

Then she tried the effects of low temperatures, down to the deadly cold of liquid air. But this also failed to discourage this heat-resistant fungus.

Science News Letter, January 24, 1931



HOW INFLUENZA COMES AND GOES

A curve showing three epidemics of the past decade following the great pandemic of 1918. These statistics were carefully compiled from industrial insurance policy holders.

ARCHAEOLOGY

King Nabonidus and the Missing Link City

Three Brief Tablets Tell How a King Deserted His Court To Set Up Another in a Conquered Cross-Roads City

By EMILY DAVIS

NEW facts have been discovered about Nabonidus, last of the native kings of Babylon—a most unusual ruler, even in a world's record of strange kingly careers.

Because it was a custom for a king to record boastfully his own achievements, and because it was equally customary for his enemies to record them for him—or rather against him—a good many of Nabonidus' deeds are known.

We know that he was one of the world's earliest archaeologists, a scholarly king who specialized in excavating ancient temples and restoring them. He forced upon the people of Babylon a Moon God far from popular in that city, and some historians deduce that this may have led to discontent and treachery within Babylon, and so to the downfall of the city. We know that this idealistic, scientific, unpopular king went off from Babylon on a strange expedition and stayed eight years, leaving his eldest son Belshazzar to steady the tottering throne.

Because government records and accounts of old Babylon were inscribed on durable little tablets of clay, instead of our fragile paper, Dr. Raymond P. Dougherty of the Yale Babylonian Collection has been able to fit together evidence that makes clearer one of the most mysterious stages in Nabonidus' career. That is his long absence from his gay, ill-fated capital, at which time he was staying at a place called Tema.

Now, Nabonidus may have been about sixty years old when he was crowned in Babylon. He reigned there only three years before he gathered an army and set out at its head to take this city of Tema, leaving Crown Prince Belshazzar to act as ruler in Babylon.

Mysteriously, the king did not return in triumph to Babylon after he had slain the prince of Tema with the sword and subdued the city, and, altogether, conducted a successful campaign. Instead, he set up a court in Tema and, as he says in one of his own inscriptions, he glorified the city so that it rivaled Babylon in splendor. And in his newly built garden spot, the elderly monarch remained for eight years, which was the greater part of his entire reign.

Historians have thought it likely that the city of Tema must have been somewhere in Babylonia. But it now appears that the expedition was far afield in the Arabian desert. There is a place there called Teima, which is spelled, you will note, not very differently from the old Tema.

Did you ever hear of this Teima in the desert of Arabia? Modern explorers have called it one of the most inaccessible towns in the world. Only seven of them have ever succeeded in crossing the "roads of death" in the treacherous, bandit-infested, hot and sandy desert to reach the blissful contrast of the oasis of Teima, with its palm tree shade, its cool breezes blowing through the houses, its refreshing water.

Not Urged to Tarry

Those daring explorers who did arrive at Teima came away after brief visits, without doing much sight-seeing, though there were interesting ruins lying beyond the present settlement. Courteously, the adventurous visitors were received, but the Arabs of Teima did not urge them to tarry, for these Arabs are political-minded folk, engaged in involved tribal disputes and always wary of strangers of unknown political pedigree.

Inhospitable as Teima seems, and little as it cares what the world may think about it, it has been chosen for a new distinction. It has been satisfactorily identified as Tema, important missing-link city of Babylonian history, a city that was front page news to the people of Babylon in the days of Nabonidus and Belshazzar.

Dr. Dougherty has worked out this problem, not by digging at the oasis city itself—the most daring archaeologist has not yet attempted that—but by long-distance methods of archaeology. He has pieced together the clues from three clay tablets. These three tablets, reposing at Yale, Goucher College, and the British Museum, have held the secret of Tema's location between them.

One of the clay tablets, in the British Museum, tells of King Nabonidus entrusting government affairs in Babylon to Belshazzar, and of his campaigning against Tema from the region of Syria in the third year of his reign. The remoteness of Tema is described.

A second tablet, belonging to Goucher College in Baltimore and pronounced by Dr. Dougherty to be extremely important, records that a man was provided with flour and a camel to journey from Babylonia to the land of Tema. The food ration provided was large and shows that the destination was distant.

The third tablet, at Yale, records the fact that a camel from a Babylonian temple was lent to a man to carry food from the temple to Nabonidus in the land of Tema. This shows, Dr. Dougherty points out, that temples of Babylonia provided food for royal consumption in Tema and furnished transportation for it.

The oasis known as Teima fits in with all these descriptions. That a Babylonian monarch might think it worth while to control the oasis can be readily understood, for it has long been an important cross-roads station for caravans.

But why Nabonidus did not come

LITTLE KNOWN TEIMA

The missing link city, isolated many days' journey in the desert. Jealous Arabs have guarded it well from archaeologists.

home to Babylon, leaving his conquered oasis in the hands of a subordinate Babylonian officer, is a problem in royal psychology of 550 B. C.

Psychologists today would probably class Nabonidus as an introvert personality, that is, a man who was a thinker, solitary-minded and self-sufficient, in contrast with the extrovert personality type which is active and social in its interests. An introvert type of king might be expected to look regally upon a desert as no barrier between his home country and his chosen residence and might keep messengers and food on the road to his desert court, as he willed.

King Nabonidus' archaeological and religious activities also demonstrate his type of personality. Temple-building, of course, was a royal duty in his time, but Nabonidus' methods were unusual. One of his first acts upon becoming established as King at Babylon was to go to the home town of his fathers, a place called Harran, and to excavate the ruins of a demolished temple to the Moon God, Sin. After figuring the proportions and measurements of the old building, in true scientific manner, the king restored it for worship, for he meant to revive interest in this god of his fathers.

In one of the king's own inscriptions, he gives what we should call today a report of his archaeological field work. He says, in the florid style of oriental royalty, that he dug into the "pure abode, the place of the rites of the priestess." He recognized the foundation area, and he saw the inscriptions with the names of the preceding kings, including a priestess of Ur. He reconstructed the house anew like the old, he declares.

Nabonidus' enthusiasm for the worship of the Moon God, Sin, led him to repair the temple of the Moon Goddess at Ur of the Chaldees. He refloored this damaged temple and made a more imposing entrance for it. It was Nabonidus, too, who added a topmost tower to the great ziggurat or stage-tower which was one of the important parts of the temple structures at Ur.

His daughter, the Princess Belshalti-Nannar, was sent to Ur to be high priestess of the Moon cult. This princess inherited some of her father's liking for antiquities. When archaeologists excavated at Ur of the Chaldees recently, they found a room in which she kept a museum of local antiquities, and a museum label which appears to be the oldest ever found.

From his study of old inscriptions the earlier kings of Babylonia. Because King Nabonidus estimated the dates of Nabonidus declared that King Sargon had reigned 3,200 years before him, historians until recently accepted his statement, and depended upon it as a landmark of ancient history. But as archaeologists have unearthed temples and graves in the East and have found new inscriptions, they have begun to doubt the royal scholar's exactness. Nabonidus appears to have allowed about 1,000 years too many in his generous estimate of old Sargon's antiquity.

FIRST ARCHAEOLOGICAL RESTORATION

The Ziggurat or stage-tower at Ur of the Chaldees as it was rebuilt by the strange King Nabonidus.

Political Reasons

It now appears that Nabonidus was not entirely the scholar-king, pursuing knowledge for its own glory, but that, more likely, he had reasons of political significance behind his digging. When he planned to make the Moon God the chief of gods in Babylon, he was promoting the worship of a deity popular among the Semitic people at Ur and Harran, the Sinai Peninsula and the Wilderness of Sin. This Moon God was known in Babylon, but Nabonidus well realized that such a deity was not likely to be popular there. And the priests of rival gods in Babylon were jealous and powerful men.

So, it has been suggested that the king hoped to make his favorite deity more impressive to the Babylonians by showing how ancient was this god and by reviving the temple worship in its early, venerable forms. But with all his efforts, the people of Babylon did not relish the Moon God's intrusion.

Nabonidus made a statute of his Moon God, and that, like much else in his career, was a queer affair. It was a figure of lapis-lazuli, we are told, wearing a crown. The old Babylonian inscriptions that mention this statue say that instead of having a crescent for a moon symbol, as Moon Gods usually did, this deity designed by Nabonidus represented the Moon in eclipse—a strange and depressing aspect for a deity of power to wear. It would appear that Nabonidus wanted to show that the god was angry because of his neglected temples.

Dr. Sidney Smith, specialist in Babylonian literature at the British Museum, has expressed the view that Nabonidus' Moon God image and his building of the temple are referred to in the Biblical Book of Daniel. In that book, the king who sets up an image and calls upon the people to bow down or be cast into a fiery furnace is said to be the great Babylonian king, Nebuchadnezzar, one of Nabonidus' predecessors on the throne. But Dr. Smith reminds us that the Book of Daniel was not written until many years after the events it describes, and after Nebuchadnezzar's death, he became a legendary figure, as Alexander the Great did, so that many deeds and anecdotes were ascribed to him which belonged by right to other rulers.

Dr. Smith further suggests that the story in Daniel which tells of Nebuchadnezzar becoming insane and eating grass and living like an animal is also a reflection of events in Nabonidus' career. The insanity story may have been in invention of Babylon's enemies. Nabonidus himself only says that when he was restoring the glories of the Moon God, he was so anxious to make the temple a worthy shrine that his "face grew troubled." This is interpreted in ancient Persian (*Turn to page* 58)

SEISMOLOGY

Mexican Earthquake Duplicates 1928 Shock

THE MEXICAN earthquake of Wednesday night, January 14, centered near the Pacific shore of the Isthmus of Tehuantepec, either a short distance inland or a short distance offshore at the bottom of the Gulf of Tehuantepec. It was in latitude sixteen degrees north, and longitude ninety-six degrees west.

This determination was made by the U. S. Coast and Geodetic Survey on the basis of reports from nineteen seismological observatories, transmitted through Science Service. Scientists at the Coast and Geodetic Survey stated that the epicenter coincides very closely with that of a very destructive earthquake almost three years ago, on March 22, 1928.

Mexico City, they stated, is peculiarly exposed to damage from earthquake shocks, even when they center as far away as the present one. The city is built on the alluvial soil of an ancient lake bed, and this loose stuff shifts easily when the underlying rock strata are shaken, bringing down the buildings that have been erected on it.

Science News Letter, January 24, 1931

NUTRITION

Use of Corn Sugar in Food Adds Calories to Diet

HEAVYWEIGHT calory-counters, among others, will need to be more than usually wary in selecting sweetened, prepared foods since the Department of Agriculture's decision relative to corn sugar.

According to this decision, just announced by Secretary Arthur M. Hyde, pure, refined corn sugar may be used to sweeten prepared foods without so stating on the label. Corn sugar sold in package or bulk must be labeled as such.

However, dextrose, which is the sugar obtained from corn, is not as sweet as sucrose, the sugar obtained from sugar cane. Consequently more corn sugar will have to be used to achieve the same flavoring effect in foods. Increasing the sugar, whether in the form of dextrose or of sucrose, increases the calories. Herein lies the danger to the unsuspecting.

The general public may be affected, as well as the obese, by an increased use of corn sugar which is expected to result from the new ruling.

"The American dietary will probably be still further excessive in carbohydrates unless the people continue to learn to eat more intelligently," the American Medical Association pointed out with reference to the extra amount of sugar that must be used for flavoring when corn sugar is substituted for cane sugar. The American diet has been severely criticized because it contains too much sugar in proportion to other foods. Sugar is an energy food, but lacks vitamins and other important food elements.

Aside from the potential danger of increasing the carbohydrate consumption of the country, the ruling, as it affects sugar alone, will not have any harmful effect on the health of the country.

"It is generally admitted that the use of corn sugar in the place of cane sugar in packaged foods of all varieties does not raise, in any sense of the words, a public health problem," the American Medical Association stated.

Science News Letter, January 24, 1931

ZOOLOGY

Zion Canyon Snails Have A Little Spire and Big Feet

LITTLE boys and girls who have heard that if they make ugly faces they will "grow that way" will be impressed by the story of the little snails in Zion National Park that have come to have extraordinarily big feet because of their extraordinary habits.

The little snails, which dot the walls of Zion Canyon, looking like black specks about the size of a match head, are apparently a unique species, Park Naturalist A. M. Woodbury states. The spire, which is plainly visible in most snails, is so reduced in size in these Zion snails that it can scarcely be seen at all, while the snail's single foot, which clings to the canyon wall, is developed to unusual proportions.

Explaining the evolution of the snail, Mr. Woodbury said that before the canyon was carved, its ancestors lived in the stream of water which later was to dig the gorge. As the canyon was carved by the river, the snails found that the tiny plants called algae on the damp canyon walls afforded better food than the river bed, and so they began to climb. The spire became smaller to prevent its being caught by debris in the water from above, and the foot became larger, the better to cling to the walls.

Science News Letter, January 24, 1931

IN SCIENC

PUBLIC HEALTH

New Jake Paralysis Cases Reported in Massachusetts

NEW cases of Jamaica ginger paralysis have just been reported to the U. S. Public Health Service.

The reports came from Massachusetts, but a possibility of cases occurring elsewnere in the country has led the U. S. Public Health Service to issue a warning against using Jamaica ginger extracts for beverage purposes.

Whether the new cases were caused by some of the old stock which caused an epidemic of cases last year is not yet known.

The adulterant used in the ginger extract which caused the paralysis cases last winter and spring was triorthocresyl phosphate, chemists of the U. S. Public Health Service found.

Science News Letter, January 24, 1931

SOCIOLOGY

Family Influence Directs Young People's Lives

THE burden of responsibility for the success or failure of young Americans was placed in no uncertain terms upon the family and family influence, at the gathering of social science experts on the family held in Cleveland during the annual meeting of the American Sociological Society.

"While the effects of the wider social relationships are not to be underestimated," Dr. H. L. Pritchett of Southern Methodist University declared, "the influences of family life are regarded as contributing the fundamental attitudes and patterns of behavior which determine one's success and happiness."

A list of nine kinds of homes that do not exert a desirable influence on young people was presented by L. C. Pressey of Ohio State University. Among them were: the "foreign-social-background" home, the inadequately-financed home, the recently-bereaved home, the high-pressure home, the "chronic dissension" home, the "favorite-child" home and the "old-fashioned" home.

Science News Letter, January 24, 1931

NCE FIELDS

PHYSICS

New Standards Laboratory Is Built Underground

WHEN optical lenses must be ground accurately to within five or six millionths of an inch, the temperature in the work room should not be shifting from 70 degrees to 85, or down the scale to 65.

Vibrations make a great deal of difference, too, and dust flying about can work havoc with one of those millionths.

However, for ten years opticians at the U. S. Bureau of Standards have had to do their work in the industrial building, where dust, noises, vibrations, and temperature changes have been frequent.

These workers are rejoicing at the news just announced by Dr. C. A. Skinner, chief of the optics division, that early in 1931, the new underground, optical laboratory will be ready for use.

Dr. Skinner explains that the layman can perhaps understand the importance of tiny, accurate measurements, when he realizes that a first class telescope lens must concentrate every beam of light from a distant source, such as a star, within an area so small that even when magnified 500 times or more, the eye can perceive nothing but a point. Moreover, the final figuring in grinding optical lenses has to be done by hand, for machinery is incapable of such fine work.

Science News Letter, January 24, 1931

PUBLIC HEALTH

Appoint Members National Advisory Health Council

THE MEMBERS of the new National Advisory Health Council, created by an act of Congress last April, have just been appointed. This Council replaces the advisory committee of the old Hygienic Laboratory, now the National Institute of Health. The new body will advise the Surgeon General of the U. S. Public Health Service on matters pertaining to the health of the country at large.

Four members of the old committee who will serve on the new council are: Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research; Dr. M. T. Ravenal, professor of bacteriology at the University of Missouri; Dr. M. J. Rosenau, professor of public health and hygiene at Harvard Medical School; and Dr. William H. Welch of Johns Hopkins University, "dean of American medicine."

The other members are: Dr. W. S. Leathers, dean of Vanderbilt University School of Medicine; Dr. Haven Emerson, professor of public health and hygiene at Columbia University; Prof. S. C. Lind, head of the department of chemistry, University of Minnesota; Dr. W. H. Howell, director of the Johns Hopkins School of Hygiene; Dr. C.-E. A. Winslow, professor of public health at Yale University; and Dr. Alfred Stengle, professor of the practice of medicine at the University of Pennsylvania.

Science News Letter, January 24, 1931

BOTANY-ETHNOLOGY

New Museum Studies Plants Found in Ruins

A BOTANICAL museum of an entirely new type, whose workers study only plants and plant materials used by Indians and other primitive peoples, both ancient and modern, has been founded at the University of Michigan. Known as the Ethnobotanical Museum, the institution and its functions were described in Cleveland by Dr. Melvin R. Gilmore, who spoke before the meeting of American Anthropological Association.

It is always of interest to know what plant foods a vanished tribe may have eaten, what plant fibers they may have woven into cloth, what kinds of wood they may have used in their houses, tools, weapons and funeral biers. These things can be determined by properly trained botanists, and such work has been done in the past, though in a more or less unorganized, haphazard fashion. Now, with the new institution a going concern, its permanent staff is constantly receiving materials for identification from all over the country. And for purposes of comparison and permanent record a very considerable series of collections is being built up at the museum.

Science News Letter, January 24, 1931

MEDICINE

Positive Facts About Cancer Summarized Before Surgeons

CANCER is today a greater menace, a more formidable scourge, than any other malady threatening our national life, with the exceptions of crime and the drink habit," declared Dr. Howard A. Kelly of Baltimore during the meeting of the American College of Surgeons in Philadelphia.

"With all our efforts, experimentations and investigations, we are as yet far removed from any worth-while knowledge of the ultimate cause or causes of this dread enemy," he said. We do, however, know a few helpful things about it. First, we know it is not contagious. Second, like every other ill in life, it is most successfully treated in its earliest stages when it is a purely local affair. Finally, we know certain preventive measures which can be taken.

"The golden rule of prevention is to look upon every persistent sore or lump in the skin, breast, mouth or any accessible part of the body as potentially serious until a competent doctor or surgeon declares otherwise," Dr. Kelly said. Any unusual condition should be investigated at once. Delay is dangerous, he emphasized. The sad habit of watching lumps or lesions until their nature becomes obvious and both doctor and patient are at length persuaded that something ought to be done is responsible for the loss of many precious lives."

Science News Letter, January 24, 1931

PUBLIC HEALTH

First Cases of Tularemia Found in Canada

TULAREMIA, or rabbit fever, has been found for the first time in Canada, the U. S. Public Health Service has just reported. The first case reported was in a miner living near Timmons, Ontario. The second was in a snowshoe rabbit near Vavenby, B. C.

Because these localities are so widely separated and are both hundreds of miles north of the United States border, it seems likely that the rabbits and other rodents of Canada have been widely infected with tularemia for many years.

Tularemia is a disease of rodents which may be transmitted to man. It was first found in California, later in other parts of western United States.

Science News Letter, January 24, 1931

ARCHAEOLOGY

King Nabonidus and the Missing-Link City

(*Continued from page* 55)

record to mean that Nabonidus had a demoniac seizure. But then the Persians were the enemies who at last conquered Babylon, and they lost no chance to put the Babylonian King in a poor light.

In the Book of Daniel, Nebuchadnezzar's insanity results from his worry over dreams which were linked with his religious perplexity, his fear of displeasing the most powerful of the deities, and losing his kingdom. Whether Nebuchadnezzar and Nabonidus are blended in the Biblical account of Babylon or not, Nabonidus surely was troubled about religion throughout his reign, and his devotion to his chosen Moon God may have caused his downfall.

One historian suggests that Nabonidus' religious beliefs were so violently opposed by the priests of Babylon that these priests even incited the people of the city to welcome Cyrus the Persian when he came to take Babylon. For Cyrus, the priests knew, would restore the old religious order of things and their own prestige. Whether Nabonidus was in Babylon at the time of its fall is not known. History says that Cyrus treated him kindly.

If the site of Teima is ever explored, it is predicted that the result will shed new light on some of these tangled events in the lives of Nabonidus and Belshazzar.

Science News Letter, January 24, 1931

PSYCHOLOGY

Women Remember Pleasant Events; Men Unpleasant

IF YOU are a woman you tend to remember, as time passes, more of the pleasant experiences in life than the unpleasant. But if you are a man, you remember the unpleasant to a greater degree than the happy things that happen to you.

This is what Dr. H. Meltzer, psychologist of the psychiatric clinic of St. Louis and lecturer at Washington University, St. Louis, found in an investigation reported to the psychologists of the American Association for the Advancement of Science in Cleveland.

He gave a new sort of psychological test to seventy-seven men and fifty-five women. Just after they had spent their last Christmas holidays he asked each to list all the pleasant and unpleasant experiences of the vacation period. Then without warning six weeks later he asked them to do the same thing. He compared the listings and found that there is a sex difference in the kind of experiences remembered after a month and a half.

The feminine tendency to forget, which Dr. Meltzer discovered, is explained by him as what psychoanalysts speak of as an escape mechanism. The female of the species uses this method of forgetting instead of resorting to alcohol, in Dr. Meltzer's opinion.

"Men more frequently than women even in modern days use what George Bernard Shaw talks of as the opiate of booze to make them forget," the psychologist said.

The larger extent of remembering of the pleasant by women is explained by Dr. Meltzer in terms of the psychology of compensation.

"The richer memory-experiences in women," he said, "are a compensation for their poorer actual experience in everyday life."

Science News Letter, January 24, 1931

NUTRITION

Government To Check Vitamin Food Claims

BUYERS of food have become so vitamin-conscious, that an expenditure of over $30,000 by the Food and Drug Administration will be required next year to check up on foods advertised as containing these important substances.

In presenting to the House Committee on Appropriations the necessity for the vitamin work, the Food, Drug and Insecticide Administration pointed out that to take action in cases where false claims were made for vitamin potency, it would be necessary to have scientific tests made, for which work the bureau is not equipped at present.

It is believed that the public is being cheated of vast sums of money through being induced to purchase foods falsely advertised as rich in one or more of the essential vitamins.

The agricultural appropriation bill, passed by the House and now before the Senate, carries an item of $30,200. for the vitamin testing work by the U. S. Department of Agriculture.

Science News Letter, January 24, 1931

ARCHAEOLOGY-ETHNOLOGY

To Study The Mayas By Living With Them

THIS WEEK a treasure-hunting party left the Field Museum of Natural History, in Chicago, to visit the extremely dense tropical forests of Central America. The treasure they will seek is not to be doubloons, however, but buried traces left behind centuries ago by the ancient Mayas which may give modern man new knowledge of the life of that great people.

The expedition is led by J. Eric Thompson, assistant curator in charge of Central and South American archaeology at the Field Museum. The party will sail from New Orleans to Belize, in British Honduras; then up the coast to the New River; and then inland up the river as far as a boat can go; and finally will travel by mule pack train and on foot to the ancient city called in the Mayan tongue Kax Unuic, or "Man of the Woods." Here ruins will be explored which probably date back as far as the beginning of the Christian era, perhaps even further.

Later the expedition will visit the dense forests of the Petén district of Guatemala, a locality where man has not lived for many years, in search of ancient Mayan cities which are known to exist but which have never been found by modern white men. If the explorers are lucky, they will find in these ruined cities the remains of old monuments bearing dates in Maya hieroglyphics.

The aid of the modern Mayan people will be enlisted to find the ruins, and by living among these people, the archaeologists hope also to be able to trace many of the present customs back to the culture of the early Mayas.

Science News Letter, January 24, 1931

ASTRONOMY

Eros: Asteroid 433

"A Classic of Science"

Its Discoverer Outlines Early Observations Made of the Strange Little Planet Which is Now Near the Earth

"This little planet, insignificant in size but of great astronomical interest, deserves special attention. It was discovered in August, 1898, photographically, by Witt, of Berlin, and at once attracted attention on account of its short period. Thanks to the numerous observations which have since been made, its elements are now known with very great precision. Its sidereal period is 643.23 days, or very nearly 1¾ years, and its synodic period 845 days,—the longest known.

"Its mean distance from the sun is 1.458 times the earth's, or 135,430,000 miles; but the eccentricity of its orbit, 0.223, is so considerable that at aphelion it is 165,630,000 miles from the sun, well outside the orbit of Mars and within the asteroid region, while at perihelion its distance is 105,230,000 miles. The inclination of the orbit is 10° 49′, the perihelion within little more than 2° of the descending node and only 21° from the earth's perihelion, so that the least possible distance between the two planets is only *13,840,000 miles*. This is only a little more than half the least distance of Venus, and at such positions (which always happen about January 22) the parallax of Eros is nearly 60."

"Observations made on the planet at such time of close approach determine its parallax, and hence with the aid of our knowledge of its orbit the parallax and distance of the sun, with a far smaller proportional error than any other direct method.

"Unfortunately these favorable appositions are very rare; and, by worse luck, one happened in 1894, just before the discovery of the planet. The nearest approach since then occurred in 1901, when the minimum distance was a little less than 30,000,000 miles. Thousands of observations, visual and photographic, were made at that time at many observatories, and their discussion has led to one of the most accurate values of the solar parallax ever determined.

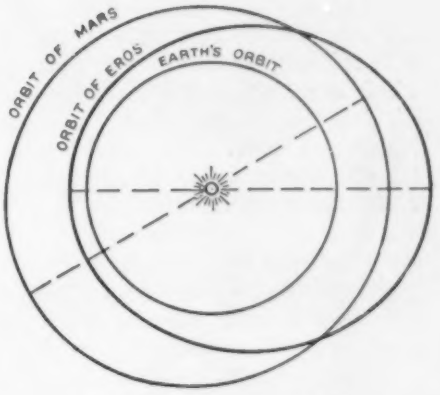
"There will be a better chance in 1931, when the least distance will be about 16,200,000 miles (on January 30). The planet will be favorably placed and is likely to be extensively observed."—*from "Astronomy," vol. I, by Russell, Dugan and Stewart.*

UNTERSUCHUNG UBER DIE BEWEGUNG DES PLANETEN (433) EROS. Inquiry into the Motion of the Planet (433) Eros. By Gustav Witt. Berlin: 1905. Translated from the German for the SCIENCE NEWS LETTER.

OBSERVATIONS of the planet Eros have been made over a period of almost ten years, from October 28, 1893, to June 30, 1903. Nevertheless a definite determination of its orbit is at the present time neither urgent or justifiable. During the opposition at the time of discovery and during the years 1899-1900, the planet has been observed comprehensively. But from the third opposition, there exist only two observations by Mr. Millosevich at Rome, which had been carried out on account of the appreciable southern declination of the planet at a zenith distance of almost eight degrees. The known positions of the planet before its visual discovery are based exclusively on photographic plates so that these plates need a very careful examination with reference to their exactness and immediate usefulness.

Nevertheless we can and will attempt, by making use of these data, to insure our knowledge of the elements of the planet to such an extent that they can serve in the future as the basis of further calculations and of the deduction of possibly definite improvements of these elements.

This is the first and foremost purpose of the present investigation. We also attempted to utilize the circumstance that at the especially favorable appositions the disturbance of the earth, which in general is very moderate, quickly increase and must influence the geocentric place of the planet. From this point of view it appears at least hopeless to investigate just to what extent even now one can attempt an improvement of the mass of the system earth plus moon and with that to attempt indirectly an independent determination of the sun parallax. In this connection one can realize what hopes one can entertain for the future with reference to further observations of the path of Eros.



THE ECCENTRIC ORBIT

Of Eros occasionally carries the small planet nearer the earth than any other heavenly body except the moon.

A not unimportant part of the preliminary investigations were carried out by Mr. Millosevich and were published chiefly in A. N. 3609 Vol. 151 p. 129 ff. Especially in this paper all the normal positions are fully published, a process that was made possible by the utilization of nearly the entire observational material from the opposition at the time of discovery. We saw no reason to modify this description; six of them were used by me without any further ado. Furthermore the article quoted above also contains a table on the influence of the disturbances by Venus, Earth, Mars, Jupiter and Saturn. I hesitated however to incorporate in the present work these data which served Mr. Millosevich to relate his improved elements to the date of the second opposition, Octo-

ber 31, 1900 since it seemed questionable whether we can assign the deviations with the necessary exactness for calculation of a definite disturbance.

In A. N. 3678 Mr. Millosevich published further improvements of the elements which harmonize better with the observations of the second opposition and finally he published the result in N. A. 3741 of a repeated calculation with reference to four normal positions which are distributed during the span of time from October 31, 1900, to March 20, 1901. The calculation of the disturbances up to this later date I could not take into account for the reason already mentioned above; on the other hand the two extreme normal positions, which by the way are not yet entirely definitive, were accepted unchanged.

For the period from March 20, 1901 to June 8, 1903 the disturbances of 433 by five planets, namely Venus, Earth, Mars, Jupiter and Saturn, were calculated by Mr. Wedemeyer on behalf of the Royal Recheninstitute in Berlin according to the method of the variation of the constant with 20 day intervals; a resumé of the end results is to be found on page 534 of the Berlin Astronomical Yearbook for the year 1905. Since the bases of this calculation were the elements deduced by Mr. Millosevich which were undoubtedly of sufficient exactness, a repetition appeared unnecessary, in spite of the fact that the calculation of the Ephemeride for the opposition of 1903 did not agree as closely with the already quoted observations at Rome as might be expected.

Now we have only to make a few general remarks concerning the photographic position of the planet Eros in the years 1893-4 and 1896. Twenty-one plates, twelve photographed in Cambridge and nine in Arequipa (Peru), were measured. Since we could not use the original plates, from each photograph two enlargements were prepared on which one millimeter represented about ten " gr. Kr. The position of the planet resulting from the measurement of these enlargements, the more or less close agreement of which permits an approximate estimate of exactness of the measurements, were published by Mr. Edward C. Pickering et al. A. N. No. 3652. . . .

The distribution of the observations from the years 1893 and 1894 permits the assumption of five normal positions; two isolated positions made November 26, 1893 and May 19, 1894 may be overlooked for at least the present. Of the six observations in the year 1896 five may be concentrated into two normal positions; a single solitary position on April 6, 1896 can not be utilized at the present time.

It appeared uncertain to carry out the definite calculation of the disturbance to the oldest date of observation at a single operation. The planet came into the closest proximity of the earth with 0.125 a.E. January 20.5, 1894. The elements must be very exact if one can not expect to find the disturbances by the Earth faulty around this date in appreciable quantities. For this reason I decided to carry out an improvement of the elements with the exclusion of the observations of 1893-4.

Here follow the tables of Witt's calculations.

From this I conclude that the numerical results at this time indicate that observation of the planet at a favorable opposition similar to that of 1893-94 would yield valuable material for an independent determination of the mass of the earth with greater precision, and that from this point of view it is worth while keeping (433) Eros under observation.

Science News Letter, January 24, 1931

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PHYSICS

Relativity Passes Three Crucial Tests

From Page 52

graphic telescopes, designed and constructed anew to apply with great efficiency upon the Einstein test. The weather and sky conditions were essentially perfect. Hundreds of star images were recorded on the plates, all in excellent focus. The images of about a hundred stars whose light had passed the sun at varying distances were selected for measurement. The ten results from the ten plates were each in good and satisfactory accord with Einstein's prediction, and the mean of all the results was essentially in precise accord with the prediction.

Test No. 3.—If the positions of the thousands of dark lines in the spectrum of the sun, representing the gases and vapors of the chemical elements composing the surface strata of the sun be measured very accurately, it should be found, Einstein said, that the lines are displaced by an exceedingly small but definite amount toward the red end of the spectrum, because the strong gravitational pull of the sun upon the radiating materials in the sun's surface would affect the outgoing waves of light in such manner as to lengthen them slightly; and we know that a lengthening of the wave lengths shifts a spectrum toward the red end of it.

Several astronomers endeavored to observe this phenomenon but by far the most comprehensive and successful program was that conducted by Dr. St. John, a member of the staff of the Mount Wilson Observatory, based upon photographs secured with the powerful tower telescopes on Mount Wilson. Although several influences are known to be capable of displacing the lines of the solar spectrum very slightly toward the red, yet St. John's results after eliminating the other influences as well as

possible, reached conclusions in substantial agreement with the Einstein prediction.

A few years ago, through the work of Eddington and others, it became evident that the fainter star in the well-known double star Sirius, though about as massive as our sun, is a surprisingly small and exceedingly dense body. A cubic inch of it, on the average, it is confidently believed, would weigh as much as 50,000 cubic inches of water. That is, on the earth a cubic inch of the star would weigh almost a ton. It was pointed out that the Einstein displacement of the lines in this star's spectrum should therefore be about twenty-seven times as great as for the lines in the sun's spectrum. Director Adams of the Mount Wilson Observatory, using the 100-inch reflecting telescope, and demanding the full power of that great instrument, succeeded in observing this displacement and he found it to be of the dimensions required by the Einstein theory.

And thus has the theory of relativity met and passed the three astronomical tests set for it by its distinguished author.

Science News Letter, January 24, 1931

PHYSICS

Einstein Discusses Revolution in Thought

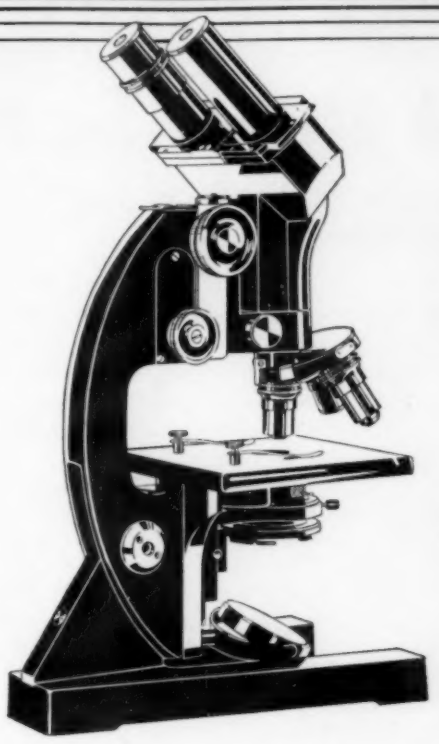
From Page 51

general relativity into the waste basket if you will, and Professor Einstein's position as the leading mind in the development of our modern physics would still remain unchallenged.

By DR. A. A. MICHELSON

I CONSIDER it particularly fortunate for myself to be able to express to Dr. Einstein my appreciation of the honor and distinction he has conferred upon me for the result which he so generously attributes to the experiments made half a century ago in connection with Professor Morley, and which he is so generous as to acknowledge as being a contribution on the experimental side which led to his famous theory of relativity. I may recall the fact that in making this experiment there was no conception of the tremendous consequences brought about by the great revolution which Dr. Einstein's theory of relativity has caused—a revolution in scientific thought unprecedented in the history of science.

Science News Letter, January 24, 1931



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The tilted binocular body of Bausch & Lomb's new GSET Microscope contributes greatly to the comfort and convenience of the microscopist. Being binocular, it relieves eyestrain, and the inclination allows you to work with the stage in a horizontal position without tiring the neck muscles. Also the new heavy stand gives stability, yet it can be moved about with ease. Maximum space is provided for manipulation of specimens.

The design of the stand, with its arm forming a sweeping, graceful arc, graphically suggests the balanced stability of the instrument. It rests solidly and securely upon the long, heavy base, and pivots at the point that assures proper balance at any inclination angle. The optics are the same as in other B & L laboratory models.

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GEOLOGY

Earth's Core Was the Child Of Two Great Flaming Suns

New Theory of Earth's Origin Holds that Outer Tenth Was Built Up by Rain of Meteorites from Space

A NEW picture of how the earth was formed was painted for geologists of the American Association for the Advancement of Science in Cleveland when Prof. Kirtley Mather, of Harvard University, summarized his latest conception of the evolution of the earth which began billions of years ago.

First of all the earth was the child of two great flaming suns which came close together and tore from themselves the molten material that was to be the heart of the ball of metals and rocks upon which we now live. In this respect, Prof. Mather's new earth origin hypothesis agrees with the famous planetesimal hypothesis of the late Dr. T. C. Chamberlain, geologist, and Dr. F. R. Moulton, astronomical physicist. And this also agrees with the later ideas of Jeans and Jeffreys, English astronomer and geologist, whose theory that tidal effects gave rise to the form of the earth has received acclaim.

This nebula born of the stars was the embryo of the earth. Dr. Mather believes it contained about nine-tenths of the present mass of the earth. Through eons of time it whirled, hot, molten, devoid of life. To the center of the revolving mass there segregated the heavy metals, such as iron, nickel and perhaps gold and platinum, which geologists feel sure are there today. The fact that earthquake waves will not pass through the center of the earth makes Dr. Mather believe that dense and heavy as the center is still, it is nevertheless molten even now.

The outer tenth of the earth, according to Dr. Mather's views, was a piecemeal present from the sky. It was built up by a rain of meteorites or shooting stars that bombarded the earth when it was young, adding tons of material to it. Geologists know that the earth is still growing in this way, although the imports from outer space are now less frequent and nearly negligible. This is fortunate, for otherwise whole cities today might be wiped out from time to time by gigantic meteor falls.

Eventually the forming earth cooled and as it solidified on its crust, the processes of what the geologist calls magmatic differentiation, the sorting out of rocks and compounds while still in molten condition, gave the surface of the earth its oceans and continents.

Much later in the life of the earth, the long periods of readjustments of the crust, wearings down and liftings up of rock layer and the evolution of plants and animals began. Man is absurdly young and a product of the last second or so of earth history when viewed with Prof. Mather's perspective.

Science News Letter, January 24, 1931

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ARCHAEOLOGY

Carnegie Scientists Inspect Maya Ruins

A TOUR of inspection of ruins of the Old Mayan Empire which Carnegie Institution archaeologists have been exploring and restoring in northern Guatemala is being made by representatives of the Carnegie Institution.

Dr. John C. Merriam, president, Dr. A. V. Kidder, chairman of the Institution's division of historical research, and H. B. Roberts, staff archaeologist, reached Puerto Barrios, Guatemala, about January 19. Ruins at Uaxactun, oldest of known Mayan cities, have been the scene of Carnegie Institution excavations since 1926.

Science News Letter, January 24, 1931

PUBLIC HEALTH

Congress May Pass Infant Welfare Bills

DESPITE opposition in medical circles, it is probable that the Jones-Cooper bill, re-enacting the old Sheppard-Towner law for maternity and infant welfare, will be passed by this session of Congress.

The measure has been passed by the Senate and is now being considered before a committee of the House. It authorizes appropriations of one million dollars per year to enable states to cooperate with the U. S. Children's Bureau in promoting health of mothers and infants, through educational work by mail, visiting nurses, clinics and health centers. Each state must match federal appropriations on a fifty-fifty basis in order to obtain federal aid.

When the Sheppard-Towner act lapsed last year, the Children's Bureau had done this work for seven years, had established 1600 child health and maternity centers in 39 states. Infant mortality and maternal mortality were reduced.

Opponents to the legislation are not only medical men, but some members of congress from those states which are especially jealous of their state rights.

Science News Letter, January 24, 1931

ZOOLOGY

Nature Ramblings

By FRANK THONE

Luckless Rodents

"Triune is death
For the race of the rat,
Feathered owl, scaled snake,
And velvet cat."

THUS a well-written bit of verse in the New York *Times*.

The poet might well have extended the list of carnivorous foes of the rodent tribe to include all flesh-eaters big enough to kill an animal from the size of a field-mouse on up. Rats and mice and such small deer have been the food of others beside Tom in Velvet for much more than seven long year; the struggle of the rodent race to survive, to breed faster than it is eaten, has without any question been going on through all the millennia since mammals became differentiated enough to draw a line between hunter and hunted, devourer and devoured. If one were to ask one of the old-time philosophical naturalists. "What is the role of rodents?" the answer might well be, "To furnish food for other animals."

Not one of the gnawing tribe escapes. Cat, owl and snake, as the poet has said, feed on the humble rats and mice; lithe-bodied weasels and their relatives coldly and terribly track squirrels and chipmunks; coyotes live on plains rodents from field-mice up to woodchucks; the crafty fox knows how to set at naught the formidable armament of the porcupine; man, the latest and most dreadful of killers, trapped the beaver nearly to extinction for his fur, and still slaughters rabbits for their meat.

Yet the rodents survive. Theirs is a simple program; breed and feed, and do both steadily and rapidly. And it has worked. By the most pragmatic of all tests, the rodents are "fit" in a world where survival is a terribly difficult job.

Science News Letter, January 24, 1931

BIOPHYSICS

Invisible Radiations From Cells Are Detected by Yeast

INVISIBLE radiations from living cells that stimulate other cells to divide and grow are being detected by a new method by Dr. Dmitry N. Borodin, working at the Boyce Thompson Institute at Yonkers, N. Y.

These radiations, whose very existence is still doubted by many biologists and physicists, seem to be something in the nature of ultraviolet light, with a wavelength about half that of the shortest-wave visible and not monochromatic light. They are so feeble that only the most delicate methods can be used to detect them, and these have required so much skill in manipulation that possible errors in experiment or observation have rendered many results dubious in the eyes of skeptical scientists. "M-Rays," as they are often called, have been recorded thus far from 56 living things. Among these are bacteria, yeasts, plant tissues (mostly roots), fertilized eggs and embryonic tissue of animals, blood, nerve cells, cancer growth and muscles.

Dr. Borodin's method is an effort to simplify the detection of the radiations without losing sensitiveness. In two drops of malt sugar solution he plants a few yeast cells. The drops hang down in a miniature moist chamber formed by a cover glass at the top, a glass ring, and a filter at the bottom, consisting of a crystalline quartz plate or a sheet of cellophane, which are both transparent to short-wave radiations. Under one of these drop cultures in a hollow microscope slide, placed below the filter, he puts living bacteria, or yeast colonies, plant or animal cells or tissues suspected of being capable of sending out the "M-Rays." The other he leaves as it is, as a check or control. Then he puts both in an incubator at a definite constant temperature, to promote rapid growth of the yeast in both drops.

In a definite time, visible colonies of yeast appear in both drops, showing difference in size. They are photographed through a microscope, and the areas of the colonies as they appear on the plates are measured by means of an instrument called the planimeter. Dr. Borodin states that in a long series of these planimetric measurements of hanging-drop yeast colonies the ones subjected to the influence emanating from living cells have practically always shown greater growth than their untreated twins kept as controls. The new method of "M-Ray" detection is called planimetric drop culture method.

Science News Letter, January 24, 1931

ENGINEERING

Two Elevators in One Shaft To Relieve Traffic

AN ELEVATOR with two cars operated separately in the same shaftway has been built and successfully operated in East Pittsburgh, Pa.

This feat depends on the development of safety devices which prevent the one car from moving when the other is in the way. The upper car is an express serving the upper half of the building and is half way up on its journey before the other is ready to start. The lower car is a local serving the lower floors.

If the lower car tries to rise to collide with the car above or if the express descends too quickly, both mechanical and electrical brakes are brought into play.

Science News Letter, January 24, 1931

SPENCER SCIENTIFIC AND EXPERIMENTAL WORKS
4503 Wolff Street, Denver, Colorado
Optical Engineering and Designing
Repairing and Special Work
Assistance in Experimental Work
Instruction in Technical and Scientific Subjects
Astronomical telescopes, reflectors, prisms, gratings, lenses, standard flats, gauges, optical instruments, supplies, patterns, castings, agate work, crystal specialties, testing, and used equipment.

March's
Thesaurus Dictionary
The "Open Sesame" to our language—finds the words to exactly express your thoughts. See full description in full page advertisement, issue of January 10, 1931.
Write for "Three Men and a Book," an entertaining booklet showing the advantages of March.
Historical Publishing Co.
Dept. SCX, 1334 Cherry St., Phila., Pa.

• First Glances at New Books

Biography

ALBERT EINSTEIN—Anton Reiser—*Boni,* 225 p., $2.50. With the author of the theory of relativity now in the United States, this biography is especially timely. It is interestingly written, and bears the stamp of approval of the leading authority on Einstein, that is, Einstein. In a foreword he says, in part, "The author . . . knows me rather intimately . . . I have found the facts of the book duly accurate, and its characterization, throughout, as good as might be expected of one who is perforce himself, and who can be no more another than I can. What has perhaps been overlooked is the irrational, the inconsistent, the droll, even the insane, which nature, inexhaustibly operative, implants in an individual, seemingly for her own amusement." The lack of an index is a defect that should be remedied before a new edition appears.

Science News Letter, January 24, 1931

Education

STANDARD GRADUATION EXAMINATION—Arthur S. Otis and J. S. Orleans—*World Book Company,* $1.25 per 25. A final examination in all subjects of elementary schools. A new form will be issued each spring and kept secret until that time. Orders accepted only from school officials, who will welcome this standard test as a practical aid.

Science News Letter, January 24, 1931

Engineering—Public Health

FURTHER STUDIES OF EUROPEAN METHODS OF STREET CLEANING AND REFUSE DISPOSAL, WITH SUGGESTIONS FOR NEW YORK—George A. Soper—*New York Academy of Medicine,* 39 p., Free. America can take lessons from the scavenging methods described.

Science News Letter, January 24, 1931

Ethnology

FORTY-FIFTH ANNUAL REPORT OF THE BUREAU OF AMERICAN ETHNOLOGY, 1927-1928—*U. S. Government Printing Office,* 857 p., $2.35. Following a brief reporting of the activities of the Bureau, this volume contains four papers. "The Salishan Tribes of the Western Plateaus," by James A. Teit is a comprehensive account covering almost 400 pages. "Tattooing and Face and Body Painting of the Thompson Indians, British Columbia" by the same author, follows. The other two are "The Ethnobotany of the Thompson Indians of British Columbia" by Elsie Viault Steedman, and "The Osage Tribe: Rite of the Wa-xó-be" by Francis La Flesche. Drawings, photographs and musical scores add to the value of the publication. The painted body designs are in color.

Science News Letter, January 24, 1931

Sociology

CHRONOS OR THE FUTURE OF THE FAMILY — Eden Paul — *Kegan Paul, Trench, Trubner & Co.,* 57 p., 2 s 6p. Another of the readable and thought-provoking "Today and Tomorrow" series which was led by "Daedalus" and "Icarus." The author predicts the final decay of the family and the substitution of homes to which children may be sent to be presided over by persons with a special talent for parenthood.

Science News Letter, January 24, 1931

Chemistry

THE SPIRIT OF CHEMISTRY—Alexander Findlay—*Longmans, Green,* 480 p., $3.75. This textbook for students who pursue a course in chemistry as an element of general culture rather than professional training, evidences a typically British insight into the history of the science. Nevertheless, it does not neglect its industrial applications.

Science News Letter, January 24, 1931

Miscellany

POPULAR QUESTIONS ANSWERED—G. W. Stimpson—*Sully,* 426 p., $2. A miscellaneous compendium of information on a vast variety of topics.

Science News Letter, January 24, 1931

Physics

DIGEST OF PHYSICS—G. L. Fletcher and J. L. Basseches—*Globe,* 244 p., 67c. A summary of elementary physics that will be useful for the student preparing for an examination. Specimen college entrance board examination questions are given at the end.

Science News Letter, January 24, 1931

Zoology

NEW AND OLD LAND SHELLS FROM THE ISLAND OF LUZON, PHILIPPINES—Paul Bartsch—*Smithsonian Institution,* 20 p., 9 pl. Of interest to systematic conchologists.

Science News Letter, January 24, 1931

Biology

LABORATORY MANUAL OF GENERAL BIOLOGY—George G. Scott—*Crowell,* 125 p., $1. A new and revised edition.

Science News Letter, January 24, 1931

Aviation

THE AVIATION INDUSTRY—*Curtis Publishing Co.,* 176 p., Free. An illuminating study of the aviation industry made by the division of commercial research of the Curtis Publishing Company. A tri-motored plane was purchased and representatives flew more than 20,000 miles in obtaining material for this report on the past, present and future of flying.

Science News Letter, January 24, 1931

Astronomy

FLIGHTS FROM CHAOS — Harlow Shapley—*Whittlesey,* 168 p., $2.50. The distinguished director of the Harvard College Observatory presents in book form the substance of a series of lectures he gave a little over a year ago in New York City. Of particular interest is his classification of material systems from the light quanta and electrons up to the entire universe of space-time itself. A large amount of space is devoted to the "cosmoplasma," the stuff between the stars.

Science News Letter, January 24, 1931

Standardization

STANDARDS AND SPECIFICATIONS FOR NON-METALLIC MINERALS AND THEIR PRODUCTS—Bureau of Standards—*Government Printing Office,* 680 p., $2.75. Collected within this one volume are the scores of specifications under which billions of dollars' worth of materials are produced, sold and consumed. This publication is one of a series in which there are being brought together by the government the commodity standards of the nation.

Science News Letter, January 24, 1931

Ornithology

BIRDS OF THE MARSHALL FIELD MUSEUM EXPEDITION, 1922-1923—John T. Zimmer—*Field Museum,* 480 p., $1.50. A fully annotated list, of interest to systematic ornithologists.

Science News Letter, January 24, 1931

Chemistry

EXPERIMENTAL CHEMISTRY — A. Frederick Collins—*Appleton,* 276 p., $2. Inelegant and ungrammatical English is expected to convert into a popular introduction to science and technology of chemistry this book that is really only a poorly arranged laboratory manual. Titles of some of the illustrations: "Old Man Chlorine," "Sweet Mamma Iodine."

Science News Letter, January 24, 1931